Workshop Without Walls: Upstairs Downstairs

Breakout Group 2 Note-taking

How much does composition matter?

assumption that volatiles enter atmosphere… (?)

small change in Mg/Si, large change in strength
mantle viscosity sensitive to small (relative) to Mg/Si - tectonics

changing Mg/Si changes density little
density distinguish between rock/ice/metal but not finer details

planet evolution, early stage composition have large impact (?), life activates processes

bulk vs. trace: bulk may be same but clouds & trace gasses may differ greatly

what would Earth look like after 4.5 billion years without life?
- life's impact on atmo/ocean exchange

redox as driver as atmospheric chemistry - rate of surface/mantle exchange
- volcanos vs mid-ocean ridges, reductant flux, Fe^{2+}
- tectonic types

have to consider hydrosphere

loss of atmospheres - larger/denser (?) planets hold on to atmospheres more easily

correlation between

biosphere metabolisms

composition change biology? biological metabolisms - metals for catalysts, avalability of reactions to use as energy

what can you actually make a (1 bar) atmosphere out of?
- N_2, He, Ar, CO_2??

tides?

are there really carbide planets?
    poorly understood

composition influence on magnetic fields

what we need to know observationally?

major vs. trace, what can we measure? future observations

huge error bars - how to constrain
    sizes of stars hard, based on a lot of modeling, optical interferometry
    TESS mission will help factor 2-3 better
    mass from RV or transit time, but with large error bars
    TESS help with asteroseismology very difficult in smaller stars

difference between star and planet?

estimate age of planet - can get age of star - account for atmo loss

deep uv flux depends on stellar rotation hard to figure out history
    survey nearby solar twins

need to account for differences in host star, age, type etc.

need to move beyond mass/density. Need albedo, chemistry,

volatile ratios
N hard, N2 directly difficult, N2O HCN better

really high resolution atmosphere, get total pressure and partial pressures

CO temperature indicator? features close to CH4

what can we do here on earth, lab experiments, thermodynamic code models

model uncertainties, propagate errors in logic chain

do we need more observations or better models?

UV observations from space would help